The new Horizon2020 “European Gravity Service for Improved Emergency Management” project
A new service for gravity field products and to support emergency response to hydrological extreme events

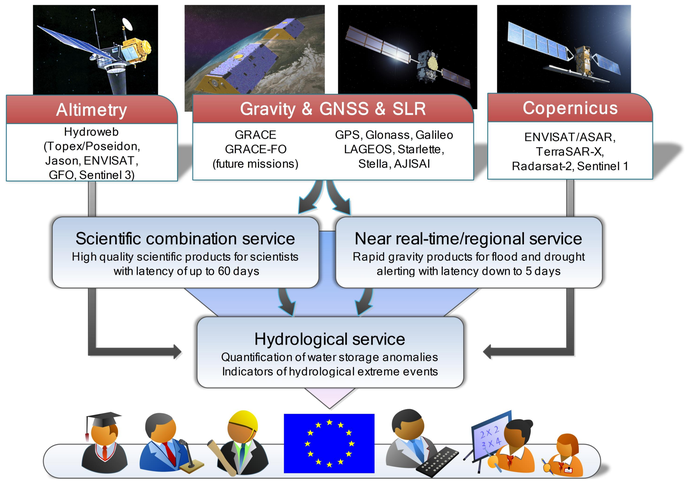
M. Weigelt, A. Jäggi, F. Flechtner, A. Güntner , T. Mayer-Gürr, S. Martinis, S. Bruinsma, J. Flury, S. Bourgogne, T. van Dam, R. Dach, Ch. Gruber

Objectives:

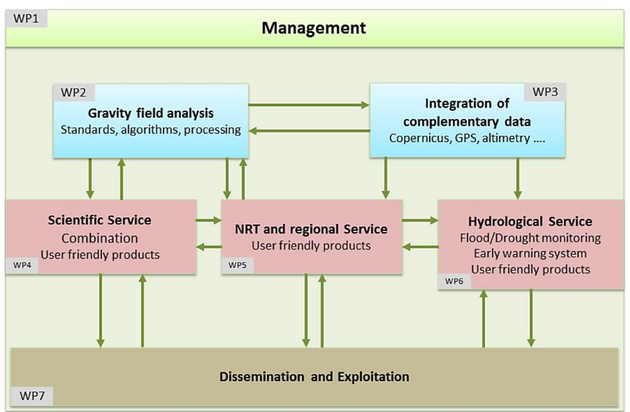
The three main objectives of EGSIEM are to

- deliver the **best gravity products** for applications in Earth and environmental science research,
- **reduce the latency and increase the temporal resolution** of the gravity and therefore mass redistribution products,
- develop **gravity-based indicators for extreme hydrological events** and demonstrate their value for flood and drought forecasting and monitoring services.

Upcoming services:

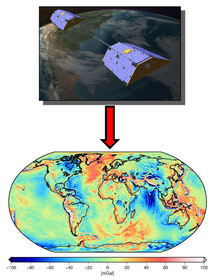


Project structure:



Central work packages:

Scientific service (WP4):

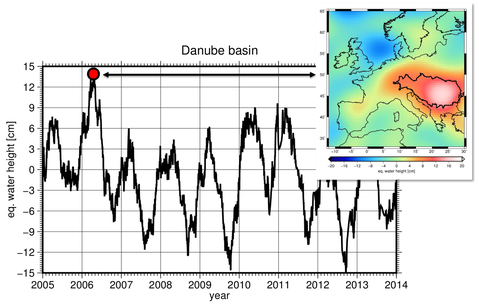


Combination of gravity field solutions based on consistent but independent processing approaches:

EGSIEM Analysis Centers (ACs):
- **GFZ** (Direct Approach)
- **CNES** (Direct Approach)
- **AIUB** (Celestial Mechanics Approach)
- **ITSG** (Short-Arc Approach)
- **University of Luxembourg** (Acc. Approach)
- (more in the future) …

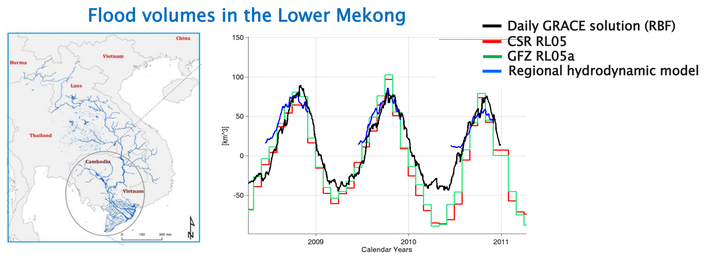
For the first time, a meaningful combination by the Analysis Center Coordinator (ACC) will be possible in order to provide suitable products for hydrological and geophysical applications from the combined and individual AC products. This task will be coordinated by AIUB.

Near real-time (NRT) and regional service (WP5):



- Daily updated solution (Near real-time with max. 5 days delay)
- ITSG: Kalman filtered solutions
- GFZ: alternative representations (e.g., radial basis functions)

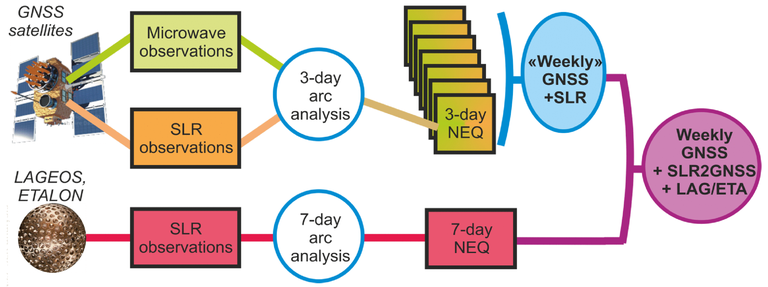
Hydrological service (WP6):



- Gravity-based flood and drought indicators as descriptors of the integral wetness status of river basins → early warning for hydrological extreme events.
- Integration into automatic flood emergency management services
- An operational test run of half a year is foreseen in the frame of DLR’s Center for Satellite Based Crisis Information.

Implications of reference frames

- Harmonization of reference frames used among ACs including background models
- Consistent reference frame for all products
- Linking geometry (GNSS) and gravity (SLR)
- Direct incorporation of degree 1 coefficients from SLR
- NRT service requires NRT reference frame (latency of max. 5 days)



Status of the project:

- Currently EGSIEM is in the process of Grant Preparation with the European Commission. The project will January 1st, 2015.
- EGSIEM will run for three years (2015-2017).
- Future integration into the services of the International Association of Geodesy (IAG), e.g., under the umbrella of the International Gravity Field Service (IGFS), and into the Copernicus emergency service is envisaged
- EGSIEM will have an open data policy and is open for collaborations with further partners.
- Collaborations/associated projects with other partners are very welcome. Service Level Agreements can be signed anytime during project duration.

In collaboration with and supported by:

Contact: Adrian Jäggi (adrian.jaeggi@aiub.unibe.ch) or Matthias Weigelt (matthias.weigelt@uni.lu)